Public Safety Land Mobile Radio Communications System Design and Engineering Services

PSCC Presentation

October 24, 2006

Today's agenda

- *FE's* background and experience
- Project methodology
- Project status
- Open discussion

FE's background and experience

- **Two decades of communications consulting**
  - Needs assessment through implementation support
  - Hundreds of client engagements
  - Thousands of person-years of experience
  - $millions in procurements
- **Independence ensures objective analyses**
  - No hardware or software biases
  - No service provider influences
  - No conflicts of interest

Ensuring success

- **Keenly aware of current trends and needs**
  - Continuous contact with hundreds of organizations in state, local, and federal governments and the private sector
- **Practical assistance**
  - Consulting, design, and procurement support
  - Strong implementation background
- **Flexibility**
  - Tailored offerings
  - No predetermined solutions

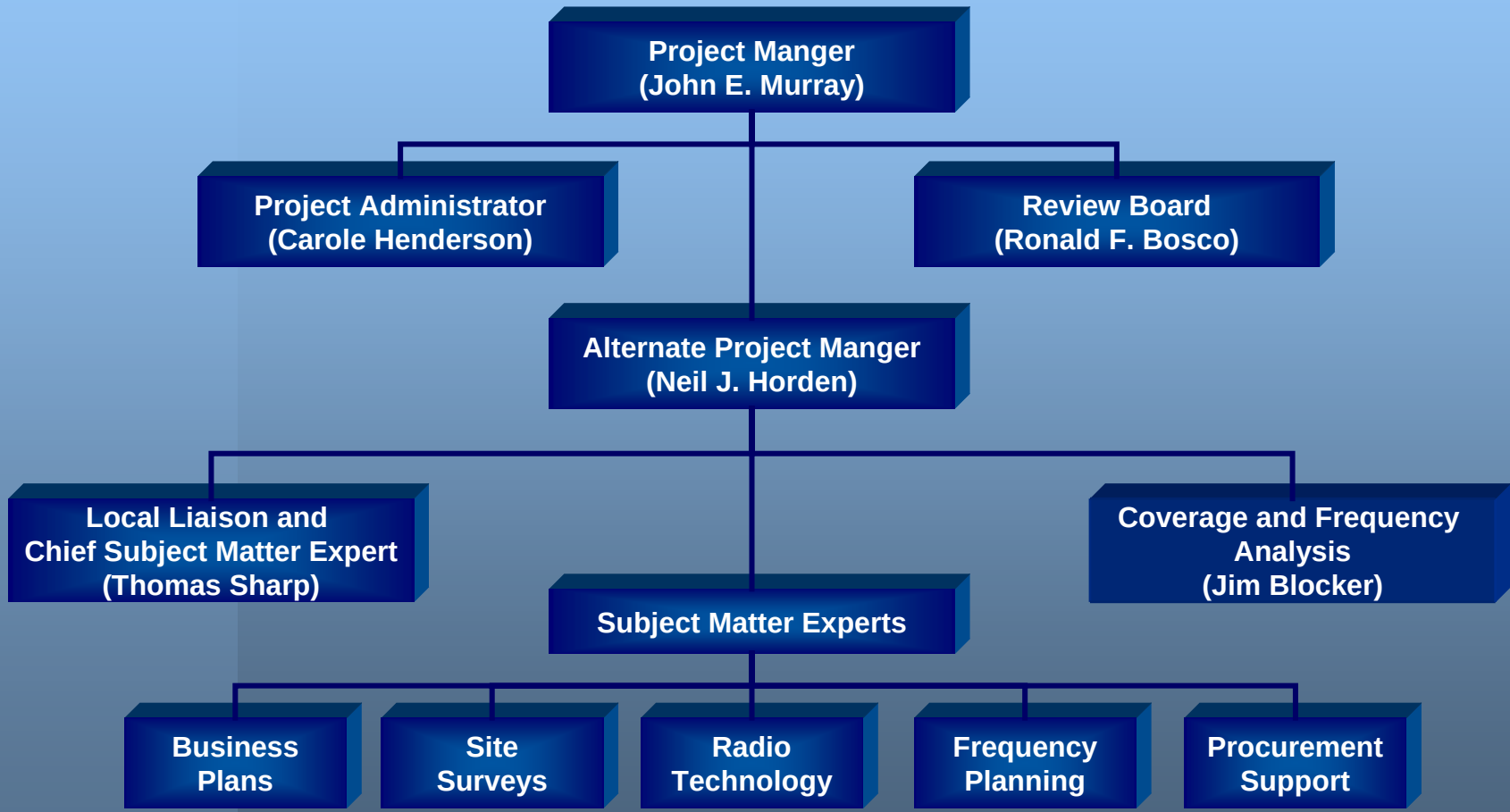
Providing practical recommendations

- Meet or exceed the current capabilities of existing systems
- Accommodate the diverse missions, needs, and technologies of the participants
- Leverage existing government assets where feasible
- Use technologies, services, and products that exist in today's marketplace
- Allow migration to emerging wireless technologies
- Solutions that facilitate coordinated administration and control
- Practical from technical, economic, performance, regulatory, and frequency availability viewpoints

Experience with similar projects

- **More state government projects than any other firm**
  - MT, NE. NY. ND, OR, SD, TN, WA, WI, WY
- **Numerous local government projects**
  - Contra Costa County, CA, Dane County, WI, Fairfax, VA, Gillette, WY, LaGrange, GA, Longmont, CO, Louisville, KY, Nashville, TN, New Hanover County, NC, Pierce County, WA, Portsmouth, VA, San Juan County, WA, Stillwater County, MT, and Virginia Beach, VA
- **Emerging consortium and regional programs**
  - NTIP - Northern Tier Interoperability Project, MT
  - ORION - Hampton Roads, VA
  - SWIP - Southwest Interoperability Project, MT
  - 15-90 Consortium, MT
  - Big Sky Anti-terrorism, MT
- **Full lifecycle support - design, specifications, procurement, implementation, and operations support**
  - Robust Quality Assurance processes throughout

Proven program team



Project leadership

- John Murray, Senior Vice President
  - Corporate officer, reports directly to *FE's* President
- Over 35 years in communications
  - 6+ years with Federal Engineering, 29 years in telecommunications
- End-user experience in EMS and Fire
- Program/project management role – *FE*'s PSMR projects
  - Statewide programs – ND, NE, WI, WY, WA, OR
  - Local/consortium efforts
- Quality assurance for all *FE* public safety programs
- Testified before numerous legislators
- Appeared before numerous SIECs, governing councils, public and industry groups

Program management philosophy

- Identify requirements
- Establish clear and attainable objectives
- Continuously manage the triad of scope/quality, cost, and time
- Represent the needs and concerns of the various stakeholders in the plans and approach
- Proactive decision making and communications
- Maximize synergy

Program management approach

- Utilize a formal project plan
  - Recognize that changes will occur
- Employ proven methodologies
  - Utilize Work Breakdown Structure (WBS) approach
  - Gantt/PERT charts
  - Resource tracking
  - Financial tracking
  - Exception reporting

Program management tools

- **Status reporting**
  - **Project status (dashboard approach)**
  - **Task objectives**
  - **Planned activities for next reporting period**
  - **PSCC actions required**
  - **Task completion status and current milestone schedule**
  - Current period accomplishments
  - Anticipated project changes
  - Scheduled tasks
  - Meetings scheduled and attended
  - Invoice payment status
- **Pre-planning of all deliverables**
  - **Outlines/abstracts approved by PSCC support staff**
  - **Assumptions & decision points confirmed before analysis begins**
- **Weekly internal project status reviews**
- **Extensive use of *FE*'s technical review board**

Quality assurance methodology

Sample dashboard report

Status	Task	WBS number	Completion date	Amended date	Comments
	Program Management	1	06/30/08		
	Establish Program Management Office	1.1	08/14/06		Completed
	Assign preliminary work assignments	1.1.1	08/14/06		Completed
	Project Plan	1.2	09/01/06		
	Create baseline Project Plan	1.2.1	08/18/06		Completed
	Identify major deliverables and reports	1.2.4	08/23/06		Completed
	Identify critical meeting requirements	1.2.5	08/24/06		Completed
	Review with PSCC	1.2.6	08/28/06		Completed
	Update Project Plan based on PSCC feedback	1.2.7	09/01/06		Completed
	Establish Risk Register	1.3	09/08/06		
	Identify Preliminary Risk areas	1.3.1	09/06/06		Completed
	Review risk areas with PSCC	1.3.2	09/07/06		Completed
	Finalize initial Risk Register and implement	1.3.3	09/08/06		Completed
	Establish FEClientNet capabilities	1.4	09/06/06		
	Request desired capabilities from PSCC	1.4.1	08/29/06		Completed
	Review design with PSCC	1.4.3	09/01/06		Completed
	Finalize and go live	1.4.5	09/06/06		Completed
	Status Reporting Process	1.5	09/07/06		
	Provide initial format to PSCC for review	1.5.1	09/06/06		Completed
	Provide initial Dashboard prototype to PSCC for review	1.5.3	09/05/06		Completed
	Issue Status Reports and Dashboard	1.6	06/30/08		Ongoing
	Project Kickoff meeting	1.7	10/24/06		
	Prepare preliminary presentation for PSCC review	1.7.1	09/14/06	09/27/06	Completed
	Update based on PSCC feedback	1.7.3	09/28/06	10/05/06	
	Present at October PSCC meeting	1.7.5	10/24/06		
	Biweekly PSCC Project Status Meetings	1.8	06/25/08		Ongoing
	Baseline the Current Systems and Needs	2	01/29/07		
	Gather Background & Previous Data	2.1	10/04/06		
	Meet with PSCC and staff to review information provided	2.1.2	09/26/06		

FEClientNet

Risk management philosophy

- Acceptance/planning
- Assessment/identification
- Analysis – qualitative and quantitative
- Response planning/mitigation
- Monitoring and control

Areas of early attention

- Availability and accuracy of site-specific information
- PSCC acceptance of findings of prior studies
- Cycle time for deliverables
- Decision making process for accepting deliverables
- Significant changes in technology/standards during the planning period

The PSCC project

- This is an implementation project
  - Move Arizona from the study phase to a working system
  - Based upon practical solutions
  - Achieves high levels of operability and interoperability
  - Vendor independent
  - Proven technologies
  - Ability to integrate new solutions as they emerge
  - Adaptable to varying levels of funding
- Encompasses a wide range of issues
  - Governance
  - Cost sharing
  - Management
  - Sharing agreements
  - Architectural plan
  - Channel plan
  - Interference analysis
  - Implementation plan
  - Business planning
  - Systems procurement
  - Project management
  - Quality assurance

Arizona's unique needs

- Nearly 60 state radio sites
- Many sites/towers near capacity
- Replacement parts increasingly difficult to find
- Limited availability of frequencies
- Interoperability challenges driven by different approaches being taken by local entities

The Interoperability challenge

Organization	VHF	UHF	800
State	✓	✓	✓
Counties	✓	✓	✓
Cities	✓	✓	✓
Tribal	✓	✓	✓
Federal	✓	✓	✓

Support the PSCC vision

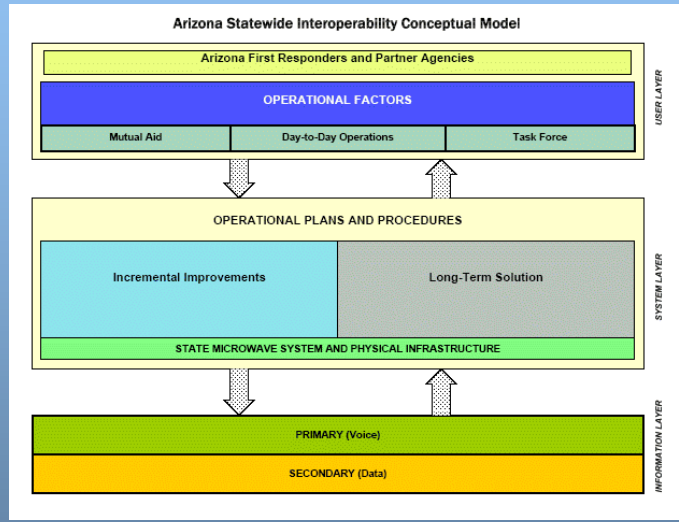
"Enable real-time, interoperable communications between local, county, state, tribal, and federal public safety entities in the State of Arizona to effectively protect lives and property."

Build upon previous work

- Macro *Statewide Radio Interoperability Needs Assessment Report,* July 2004
- RCC *Statewide Interoperability Report for the Department of Emergency Managements,* March 2005
- Gartner *Concept of Operations Report,* October 2005
- *Arizona State Agencies Inventory Report* compiled by Public Safety Communications Commission (PSCC)
- Arizona Department of Public Safety Telecommunications Bureau, *Microwave and Radio Systems 2005*
- FCC State license inventory compiled by PSCC including FCC licenses, site locations, and frequencies currently in use
- PSCC Interviews and meeting minutes
- SIEC Meeting Minutes
- Participation in PSCC/SIEC Work Groups

Gartner ConOps report

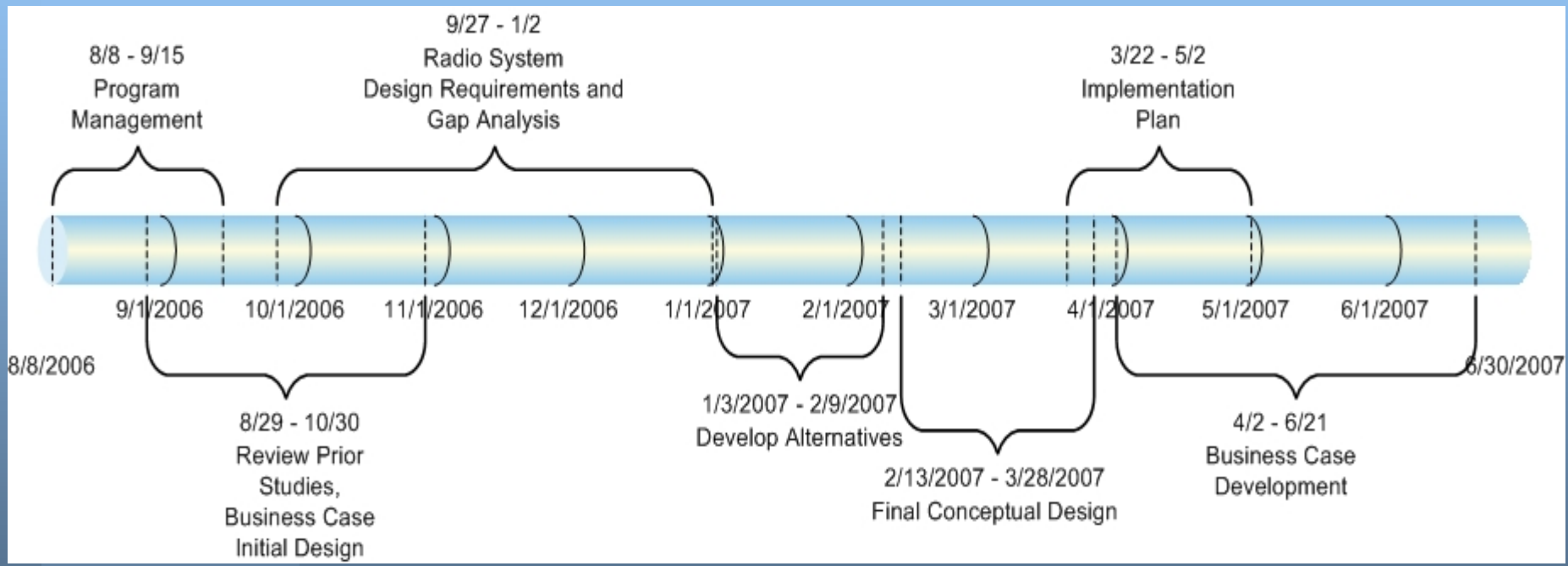
- Roadmap for overall improvements in public safety wireless communications
- Defines the case for and nature of critical changes required
- Defines three-layered model – user, system, informational
- Identifies key milestones and action items moving forward



Program approach

- **Phase I**
  - Conceptual architecture
  - Business Plan
- **Phase II**
  - Demonstration project technical specifications
  - Procurement support
  - Technical and project oversight

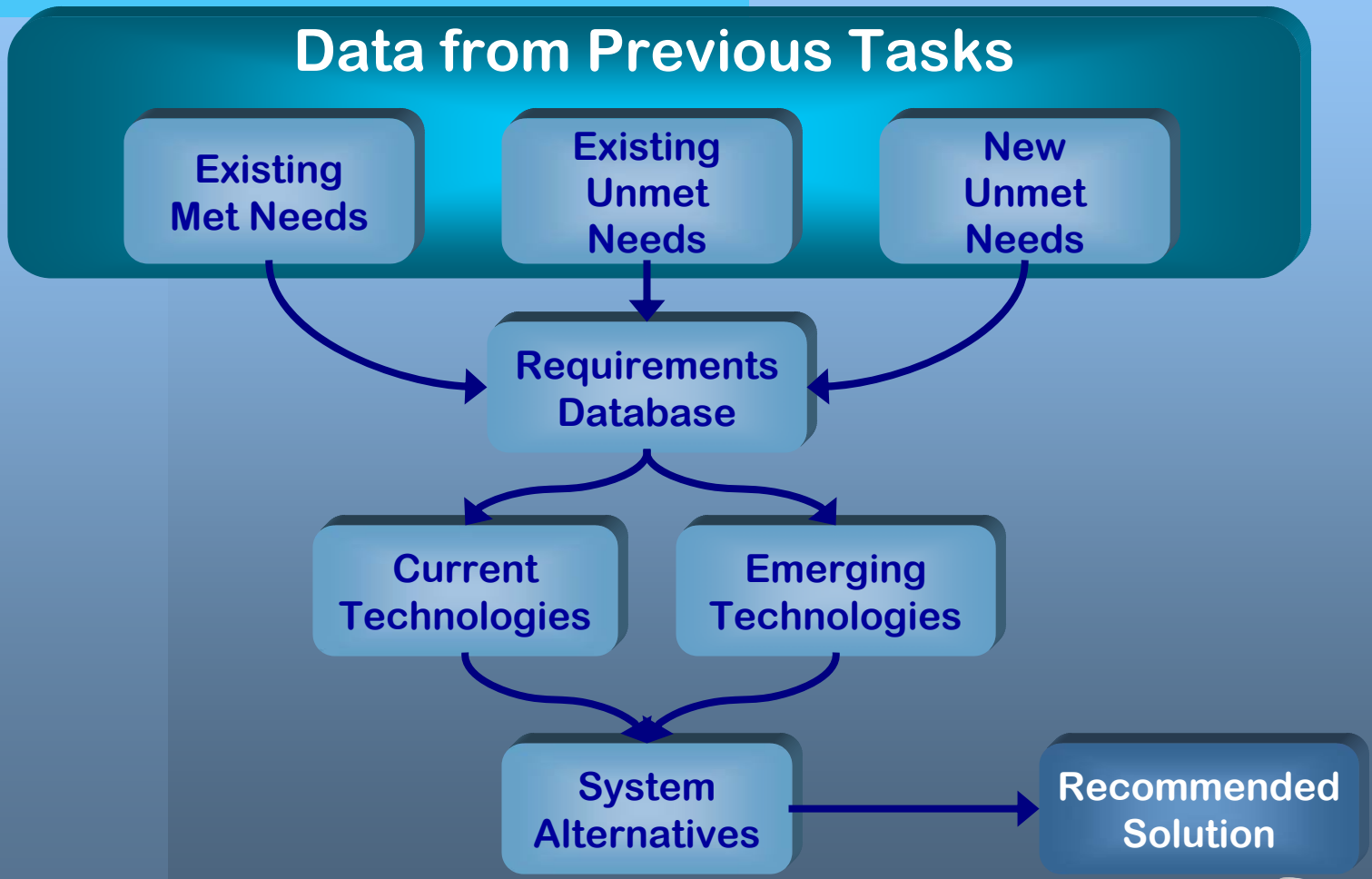
Conceptual architecture planning (Phase I) timeline



Developing the conceptual architecture

- **Based on user needs**
  - Start with results of previous studies
  - Meet with PSCC staff to understand what has been accepted
  - Identify missing or questionable information
  - Work with PSCC staff to fill the gaps
- **Major tasks**
  - Radio system design
  - Coverage analysis
  - Develop alternatives
  - System architecture recommendation

Architecture considerations



Designing the radio system

- Driven by user needs for operability and interoperability
- Leverage existing assets
- Employ open, standards-based technologies
- Leverages best practices from other states, SAFECOM, and APCO
- Practical from technical, economic, performance, regulatory, and frequency viewpoints

Analysis of existing and proposed coverage

- **Objectives**
  - Determine core sites including existing and new sites
  - Develop statewide composite coverage maps comparing existing systems with that of conceptual design
- **Highly customized process**
  - Based upon user needs, existing infrastructure, terrain, and Arizona environment
  - Incorporate many factors: frequency band, repeater sites, equipment, foliage, etc.
- **Based upon industry accepted standards**
  - Use Telecommunications Industry Association (TIA) Technical Services Bulletin (TSB) Number 88, Revision B
- **More than just a number….**

Key elements of the system design

- Top-level performance and operational objectives
- Statewide composite coverage maps comparing existing systems with that of conceptual design
- Recommendations for use of various possible frequency bands (VHF, UHF, 700 MHz)
- Phased implementation plan
- Cost and timelines for each phase
- Tactical use of VHF and conventional mode
- Contingency programming requirements of subscriber equipment
- Maximum capabilities of ultimate system

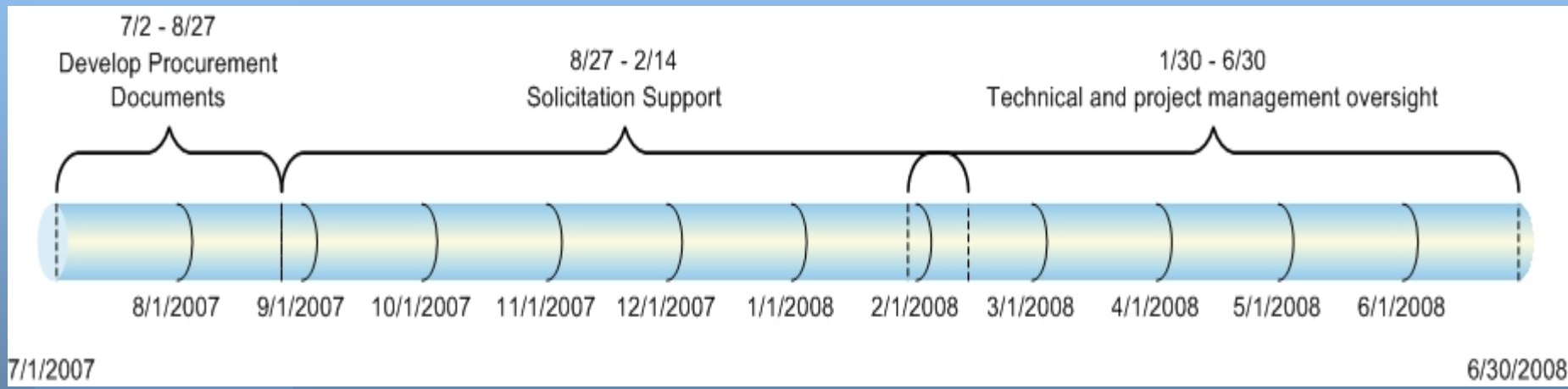
Developing the Business Plan

- **Massive investment requires sound Business Plan**
  - Tailored to Arizona's financial, operational, and legislative requirements
  - Work with PSCC staff to define approach
- **Much of the input derived from Conceptual Architectural planning task**
  - Business Plan will be developed in parallel
- **Leverage the experience of other state governments**

Major elements of the Business Plan

- Long-term governance plan
- Acquisition strategy
- Life-cycle support models
- Cost sharing model
- Operating, maintenance, and replacement costs
- Staffing models
- Project risks and management plan
- Estimated implementation costs and schedule for demonstration project
- Estimated implementation costs and schedule for statewide radio system
- Frequency and channel plan
- Intergovernmental agreements for partner agencies
- Intergovernmental agreements for other agencies' assets

Phase II Timeline - Procurement and Demonstration Project)



Purpose of the Demonstration Project

- Validation of the design concept
- Stakeholder/future user awareness
- Installation, test, and cut-over processes
- Scope, scale, and cost estimates for construction
- Increase potential for federal funding
- Test bed for multi-vendor equipment
- Operations, training, and management procedures
- Improve interoperability
- Detailed design, testing, and implementation

Developing the technical specifications

- Vendor-neutral
- Top-level system performance and operational objectives
- Industry standards requirements
- Mobile radio frequency coverage test requirements
- Equipment and systems acceptance test requirements
- User operational and maintenance training requirements
- Documentation requirements as technical "as-built" drawings and user manuals
- Facility specifications to meet the demonstration project requirements
- User performance/measurement tools and feedback

Supporting the procurement effort

- Identify potential bidders
- Pre-proposal conferences
- Answer bidders' questions
- RFP addenda
- Evaluation mechanisms
- Proposal evaluation
- Proposal clarification questions
- Best and final presentations
- Vendor plant visits
- Contract negotiation assistance

Supporting the implementation effort

- Project kick-off meeting
- Communications between PSCC and vendors
- Detailed system design approval
- Coordination of work efforts
- High level program plan
- Program status
- Construction and installation inspections
- Vendor acceptance test plan
- Turn-up, testing and acceptance activities

Progress to date

- Established Program Management office
- Identified early informational requirements from stakeholders
- Began analysis of needs from prior studies and reports
- Engaged local agencies in informational review of their existing and planned systems
- Provided abstracts of first two reports
- Began coverage analysis process

Open Discussion